

1 Introduction

Coho salmon (*Oncorhynchus kisutch*) have experienced a significant decline in the past 40 to 50 years. Coho salmon abundance, including hatchery stocks, has declined at least 70% since the 1960s, and is currently 6 to 15% of its abundance during the 1940s. Coho salmon harvest decreased considerably in the late 1970s, despite a fairly stable rate of hatchery production. Recent abundance-trend information for several stream systems along the central and north coasts indicates an overall declining trend throughout California.

As a result, the California Fish and Game Commission (Commission) received a petition to list coho salmon north of San Francisco to the Oregon border as an endangered species under California Endangered Species Act (CESA). The California Department of Fish and Game (Department) prepared a comprehensive status review of the species, which recommended that the species be listed as endangered south of Punta Gorda to San Francisco Bay and threatened north of Punta Gorda to the California-Oregon border. The Commission found the recommendation to be warranted, but deferred regulatory action to add the species to the threatened and endangered species lists, and directed the Department to prepare a recovery strategy for coho salmon. This report fulfills that mandate, and the Commission formally adopted the Recovery Strategy on February 4, 2004.

1.1 STATE OF CALIFORNIA COHO SALMON LISTING ACTIONS

On December 16, 1993, the Santa Cruz County Fish and Game Advisory Commission submitted a petition to the California Fish and Game Commission (Commission) to list coho salmon south of San Francisco Bay under CESA. On April 7, 1994, the Commission designated the coho salmon south of San Francisco Bay a candidate species, starting the one-year review process by the Department. Based on this review, the Department recommended that coho salmon south of San Francisco Bay be listed as endangered. The Commission accepted the recommendation and listed those coho salmon as endangered, effective December 31, 1995.

On July 28, 2000, the Commission received a petition to list coho salmon north of San Francisco as an endangered species under CESA. The Commission referred the petition to the Department on August 7, 2000, for evaluation. The Department found that the information in the petition was sufficient to indicate the action may be warranted and recommended that the Commission accept the petition. The petition was accepted by the Commission on April 5, 2001. On April 27, 2001, the Commission published a Notice of Findings in the California Regulatory Notice Register declaring coho salmon a candidate species, thereby starting the candidacy period. Pursuant to Fish and Game Code (FGC) §2074.6, the Department prepared a status review evaluating the status separately for the two coho salmon Evolutionary Significant Units (ESUs) that occur in California. (See section 1.2 below regarding ESUs.) The Department recommended that coho salmon be listed as endangered from Punta Gorda south to San Francisco Bay and threatened north of Punta Gorda to the California-Oregon border.

On August 30, 2002, the Commission found that coho salmon warranted listing as an endangered species under CESA from San Francisco Bay north to Punta Gorda and as a threat-

ened species from Punta Gorda north to the California-Oregon border. However, the Commission deferred regulatory action to add the species to the State threatened and endangered species lists while a recovery strategy was prepared, keeping in place regulations, which were adopted by the Commission pursuant to FGC §2084 in April 2001, that allow for incidental take of coho salmon. Both hatchery and naturally produced coho salmon are included in the CESA listing and are addressed by the Recovery Strategy.

1.2 FEDERAL COHO SALMON LISTING ACTIONS

In 1993, Oregon Trout, Pacific Rivers Council, and others petitioned for listing of coho salmon in California, Oregon, Washington, and Idaho under the Federal Endangered Species Act (ESA). National Oceanic and Atmospheric Administration National Marine Fisheries Service (NOAA Fisheries)¹ identified six ESUs of coho salmon in California, Oregon, and Washington. The ESUs in California are the California Central Coast (CCC) Coho ESU and the Southern Oregon-Northern California Coasts (SONCC) Coho ESU. The CCC Coho ESU extends from the San Lorenzo River in Santa Cruz County north to Punta Gorda in Humboldt County (Federal Register 1996). The SONCC Coho ESU begins at Punta Gorda and extends north into Oregon to Cape Blanco (Federal Register 1997). The CCC Coho ESU and SONCC Coho ESU were listed as threatened on December 2, 1996 and June 5, 1997, respectively (Federal Register 1996, 1997).

The status of California coho salmon populations was recently reviewed and updated by NOAA Fisheries Southwest Fisheries Science Center (NMFS 2001a). This status review update confirms previous conclusions of the NOAA Fisheries Biological Review Team: 1) the CCC Coho ESU is presently in danger of extinction and the condition of coho salmon is worse than indicated by previous reviews, and 2) the California portion of the SONCC Coho ESU warrants threatened status and is likely to become endangered in the foreseeable future. NOAA Fisheries is presently updating status reviews and revisiting listing determinations for all salmon and steelhead ESUs that have one or more hatchery populations included in the ESU. This includes both the CCC and SONCC Coho ESUs.

1.3 STRATEGIC PLANNING FOR RECOVERY

Planning for coho salmon recovery is a complex process that involves both State and Federal actions because of the species' status under both the ESA and CESA. This section describes actions of the Commission, the recovery teams that were assembled to aid the Department in its development of a coho salmon recovery strategy (Recovery Strategy), and the Federal government's preliminary steps toward a Federal recovery plan.

1.3.1 FISH AND GAME COMMISSION ACTION

Following the determination that coho salmon warranted CESA listing, rather than proceeding immediately with regulatory action, the Commission, pursuant to FGC §2114, directed the Department to prepare a Recovery Strategy for coho salmon within 12 months under FGC §2105 *et seq.* The Commission subsequently extended this deadline a total of 18 months, to February 2004.

¹ National Marine Fisheries Service now uses the acronym NOAA Fisheries. NMFS was used until mid-2003. In this document, NMFS is used in direct quotations from and citations to documents that were published when NMFS was used; otherwise, NOAA Fisheries is used.

During this time extension, the Department released a public review draft of the Recovery Strategy (dated November 2003). The Department voluntarily provided a 21-day comment period on the public review draft and held three public meetings. Approximately 173 people attended the public meetings and a total of 79 people submitted written and/or verbal comments during this period. The Department prepared a formal Response to Comments (available on the Department's website) that detailed changes made, in response to public comments received, in the November 2003 draft of the Recovery Strategy. During the Commission meeting on February 4, 2004, the Commission approved the Recovery Strategy, as modified by the Response to Comments, and inclusive of the Department's recommendations for specific provisions of the timber management alternatives.

1.3.2 DEPARTMENT OF FISH AND GAME ACTION

In accordance with the Commission's direction as well as statutory requirements, the Department immediately embarked on establishing two recovery teams: a Range-wide Coho Salmon Recovery Team (CRT), and a local Shasta-Scott Recovery Team (SSRT) for a special focus on agricultural water and land use in the Shasta and Scott River valleys in Siskiyou County. The Department sought innovative ideas and creativity in the development of a strategy that balances coho salmon recovery with other interests. Both teams brought together people with a variety of concerns and perspectives. The efforts of the two teams, over a short time frame, aided the Department in the development of a single Recovery Strategy to recover coho salmon throughout its range in California.

1.3.3 RANGE-WIDE COHO SALMON RECOVERY TEAM

The CRT is made up of 21 members from a wide range of interests, professions, and perspectives. The team represents county, State, and Federal governments, tribes, commercial and recreational fishing, forestry, agriculture, ranching, water management, and environmental interests. The CRT first met and commenced its work in December 2002. The team addressed many significant issues affecting coho salmon range-wide: coho salmon habitat; coho salmon population numbers; water quality, quantity and use; county and other agencies public works; agriculture, forestry, and ranching; legacy effects of activities that took place decades ago; monitoring of habitat improvement efforts and coho salmon population numbers; respecting private property rights; incentives to promote voluntary efforts to improve habitat; prioritizing recovery actions across the range of both ESUs; and restoration of Tribal, recreational, and commercial fisheries.

The CRT recognizes that recovery of the coho salmon requires a cooperative effort across entire watersheds, considerable financial investment, and many years of effort. The CRT developed a mission statement to guide their effort to aid the Department:

Within our vision of restoring populations of coho salmon, including healthy, wild, naturally reproducing populations throughout its range, and restoring Tribal, commercial, and recreational fisheries in California, it is our mission to aid the Department in the development of a recovery strategy for coho salmon, with the goal that the species will no longer warrant listing.

On August 4, 2003, the CRT sent an independent report to the Director detailing their findings and recommendations. The report also included a partial list of existing voluntary and cooperating groups and activities focused on recovery of coho salmon by watershed. The CRT report to the Director can be viewed on the Department website. CRT recommendations are presented in Chapter 7 (Range-wide Recommendations) and Chapter 8 (Watershed Recommendations).

1.3.4 SHASTA-SCOTT RECOVERY TEAM

The SSRT is made up of 13 members representing a variety of interests in the Shasta and Scott valleys in Siskiyou County. Members include landowners, local governments, State and Federal agencies, environmental groups, and recreational anglers. The SSRT held its first meeting in January 2003 and was tasked with assisting the Department in development of recommendations that will help recover coho salmon relative to agricultural water and land uses in the Shasta and Scott valleys. The focal points of the SSRT are to restore coho salmon populations, maintain a healthy agricultural industry, and water management in each valley. A mission statement was agreed to as follows:

Within our vision of restoring healthy, wild and naturally reproducing populations of coho salmon in the Shasta and Scott Rivers, it is our mission to provide the Department of Fish and Game with recovery recommendations focusing on agriculture and agricultural water use, based on local knowledge and scientific information regarding the biological and physical environment, local customs and preferences, as well as local experiences with habitat restoration efforts and strategies. It is our goal to aid the Department in development of a recovery strategy for coho salmon, with the eventual goal that environmental conditions in the Shasta and Scott Rivers will no longer be found to be contributing to the need for listing of coho salmon as a threatened or endangered species in California. Further, it is our intent that the Recovery Strategy developed by the "Scott and Shasta Rivers Pilot Program" will become a demonstration project for future recovery strategies for other threatened or endangered species in California and the nation.

On July 28, 2003, the SSRT sent an independent report to the Director entitled *Shasta and Scott River Pilot Program for Coho Salmon Recovery: with recommendations relating to Agriculture and Agricultural Water Use*, which can be viewed on the Department's website. SSRT recommendations, presented as the Shasta-Scott Pilot Program (SSPP), are in Chapter 10.

1.3.5 FEDERAL TECHNICAL RECOVERY TEAMS

NOAA Fisheries is in the process of developing scientifically based criteria for delisting ESUs of anadromous salmonids, including the CCC and SONCC Coho ESUs of coho salmon. Federal recovery efforts are focused on geographically defined Recovery Domains. There are two phases in the Federal recovery planning process for anadromous salmonids. Phase I is the development of recovery goals. These goals will be developed by Technical Recovery Teams (TRTs), which will also be responsible for developing criteria that, when met, will allow listed species to be removed from the Federal Endangered Species List.

Four Recovery Domains exist in California, and TRTs have been created for both California Recovery Domains that include coho salmon. The TRTs are responsible for developing recovery criteria for all the listed salmonids in the recovery domain. The TRTs are composed of scientists from NOAA Fisheries, other Federal and State agencies, academia, and other local experts on salmon biology. Department biologists are part of both coho salmon TRTs, which are chaired by NOAA Fisheries staff.

TRT activity will be the primary focus of all teams for the next several years. Both the Southern Oregon/Northern California and North-Central California Coast TRTs had their first meetings in October 2001.

1.4 RECOVERY STRATEGY FOR COHO SALMON IN CALIFORNIA

This Recovery Strategy is based on general goals identified in this section, which also describes the approach to recovery and implementation considerations. For reference, the abbreviations and acronyms used in this document are listed in Appendix A and technical terms are defined in Appendix B.

1.4.1 GENERAL GOALS

The primary purpose the Recovery Strategy is to recover coho salmon to the point where the regulations or other protections for coho salmon listed under CESA are not necessary. In addition, the Recovery Strategy seeks to restore Tribal, recreational, and commercial coho salmon fisheries in California.

On February 4, 2004, the Commission found that the Recovery Strategy met specific conditions contained in statute [FGC §2111(a)-(e)]² and approved its adoption. These conditions are:

- a. The Recovery Strategy would conserve, protect, restore, and enhance the species;
- b. The Recovery Strategy and the implementation schedule are capable of being carried out in a scientifically, technologically, and economically reasonable manner;
- c. The Recovery Strategy is supported by the best available scientific data;
- d. The Recovery Strategy represents an equitable apportionment of both public and private and regulatory and nonregulatory obligations; and
- e. The Recovery Strategy would recover a formerly commercially valuable species to a level of abundance that would permit commercial use of that species.

The approach to achieving the primary goal of recovery is to improve coho salmon populations and habitat so the species is neither threatened nor endangered with extinction throughout or in a significant portion of its range and the regulations or other protections for coho salmon under CESA are not necessary. In order for an ESU to be down or delisted, recovery goals should be attained in each recovery unit within the ESU (see Chapter 6). Significance is not defined by CESA but is a scientific judgment based on the entire record of the species.

Achieving recovery will require meeting five delisting goals and corresponding criteria that address coho salmon populations and habitat:

- GOAL I Maintain and improve the number of key populations and increase the number of populations and brood years of coho salmon.
- GOAL II Maintain and increase the number of spawning adults.
- GOAL III Maintain the range and maintain and increase the distribution of coho salmon.
- GOAL IV Maintain existing habitat essential for coho salmon.
- GOAL V Enhance and restore habitat within the range of coho salmon.

A sixth goal meets the criterion set forth in CESA, which requires that in order to approve the Recovery Strategy, the Commission must find, among other things, that the Recovery

² FGC §2111(e) was added by SB 216 (Statutes 2003 Chap. 854). The author of SB 216 notes in a letter, dated September 12, 2003 (published in the Senate Journal on September 13, 2003) that it "does not change the primary goal of the Recovery Strategy program as set forth in Section 2105 of the Fish and Game Code... Therefore, if a species has recovered to the point that the regulatory requirements or other protections for species listed pursuant to CESA are no longer necessary, then no permit pursuant to CESA would be required for incidental take of the species, even if the species has not achieved a level of abundance that would permit resumption of commercial use."

Strategy would recover a formerly commercially valuable species to a level of abundance that would permit commercial use of that species [FGC § 2111(e)].

GOAL VI Reach and maintain coho salmon population levels to allow for the resumption of Tribal, recreational, and commercial fisheries for coho salmon in California.

Once delisting is achieved and protections under CESA are not necessary, it is the intention of the Department to collaborate with the CRT and the SSRT to determine how to continue implementation of appropriate elements of the Recovery Strategy.

1.4.2 ELEMENTS NECESSARY TO ACHIEVE RECOVERY GOALS

The Recovery Strategy is centered on several elements necessary to achieve the goals of recovery. The foundation of recovery will be based on these elements and implementation of recovery actions at various biological and geographic levels. The Department's recovery elements are education and public outreach, emphasizing the cooperation and coordination of the public and private sectors, implementing and enforcing existing laws, maximizing use of public lands for protection and recovery, and conducting research and monitoring to track and understand the progress of recovery and make needed changes over time to advance coho salmon recovery.

The Recovery Strategy takes the approach of dividing California coho salmon into geographic and biological units. The primary biological division is the ESU. With the CCC Coho ESU designated as endangered and the SONCC Coho ESU designated as threatened, the Recovery Strategy treats each ESU separately. Additionally, as unique populations are identified within either ESU, specific directed actions may occur to promote the potential of recovery.

Prioritization is of paramount importance to the Recovery Strategy. By establishing priorities, the Recovery Strategy will ensure efficient use of resources on the most effective recovery activities. These priorities, which were derived with involvement of the recovery teams, land owners and watershed councils, are set both geographically (by HSA) and by task. Entire watersheds and subunits of watersheds are the primary geographic divisions and are discussed individually.

1.4.3 IMPLEMENTATION

The Recovery Strategy includes hundreds of potential actions to recover coho salmon. FGC §2114 states: "The Recovery Strategy itself shall have no regulatory significance, shall not be considered to be a regulation for any purpose ... and is not a regulatory action or document." Therefore, the recommendations will be implemented through existing statutory and/or regulatory authorities, voluntary actions, and/or new statutory and/or regulatory authority.

Responsibility for implementation of the Recovery Strategy lies primarily with the Department, which intends to work closely with other entities to ensure that the tasks are undertaken. Implementation of these actions will require many years, long-term commitments and involvement of many parties and organizations, considerable financial support, and careful planning and management.

The Recovery Strategy describes issues facing coho salmon and the many recommendations to address the issues, the vast majority of which were discussed and recommended by the recovery teams to the Department. The implementation schedules in Chapters 9 and 10 list actions by task-level priority, potential party or parties capable of (and in some cases responsible for) carrying out the actions, and the estimated commencement time and duration. The task level priorities identified in the implementation schedule are to be considered in conjunction with watershed priorities developed by the CRT and the Department, which are identified in the implementation schedules and described in section 6.3.

Implementation of recovery tasks has the potential to affect other species listed under ESA and under CESA. Potential effects on the conservation of these species could range from beneficial to detrimental. Other species at risk within the range of coho salmon, and any constraints on the implementation of recovery actions, are described in Appendix C.

1.4.3.1 Interim Actions

Some recommendations for recovery of coho salmon can be implemented immediately, both because it is economically and technical feasible and because no regulatory or statutory change is required to start the recovery activity or decision. For the purposes of this Recovery Strategy, interim actions are defined as those actions that can be initiated immediately or within the first five years of the strategy and require no regulatory or statutory changes.

1.4.3.2 Long-term Actions

Long-term recommendations require more time and planning before they can be implemented, a long duration to complete, additional funding, or require changes to law or regulation to be successful or even allowable.

1.4.4 ADAPTIVE MANAGEMENT

The Department believes adaptive management³ is essential for successful planning and implementation of coho salmon recovery. Adaptive management is the process of involving scientific method and the experience of stakeholders and resource managers in an iterative process that allows for plan flexibility and responsiveness in revising the Recovery Strategy based on the best available scientific and other data. The Recovery Strategy is based on the current best available scientific and other information, but comprehensive and predictive knowledge is not available regarding ecological processes, synergistic effects of human activities, stochastic natural events, the most effective management practices, and the means of addressing stakeholder issues or conflicts. As we learn more about these things, adaptive management allows the Recovery Strategy to benefit accordingly.

The adaptive management process used in the Recovery Strategy is a six-step cycle, the success of which depends on the completion of all six steps:

1. Assess the problem by identifying the issues facing coho salmon and habitat and evaluate the scientific, management, and economic options and feasibility of potential solutions;
2. Design and select the policies, programs, and activities to be applied to recovery and additional assessment;
3. Implement programs and activities for recovery of coho salmon and continuing assessment designed to reveal the critical knowledge that is currently lacking;
4. Monitor the key response indicators that inform the Department on the progress and effectiveness of recovery programs and activities, and status and trend of coho salmon and habitat;
5. Evaluate recovery activities, programs, and assessment and monitoring information; and
6. Adjust and incorporate the results of implementation and monitoring into future decisions and revisions of the Recovery Strategy.

³ Adapted from Taylor et al., 1997.

